



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

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May 9, 2013

Mr. Paul Rosasco, P.E.
Engineering Management Support, Inc.
7220 West Jefferson Avenue, Suite 406
Lakewood, CO 80235

RE: Comments on draft Work Plans for Supplemental Feasibility Study (SFS) Amendment,
West Lake Landfill Operable Unit 1 (OU-1), Bridgeton, Missouri

Dear Mr. Rosasco:

The Missouri Department of Natural Resources has completed its review of the above referenced documents prepared by Engineering Management Support Inc. (EMSI) and is transmitting the enclosed final comments. This additional work is summarized in a letter from EPA dated October 12, 2012. In that letter, the EPA states that the Respondents agreed to perform the following six additional studies to be documented in an amendment to the SFS report: (1) Alternative Excavation Volume, (2) Partial Excavation Alternative, (3) Apatite Treatment Technologies, (4) recalculation of costs for all alternatives using a seven percent Discount Rate for the Present Value calculations, (5) Alternative Landfill Cap Designs, and (6) Fate and Transport Modeling.

The Department's comments are categorized by either general comments that pertain to all work plans, or by comments that apply to the particular work plan as noted. Please note that these comments pertain to the original drafts of the work plans you provided on specified dates, and that any modification(s) to the work plans, due to clarification from EPA or otherwise, may require additional review by the Department.

We are available to discuss these comments with you and the EPA for clarification, and can also review any interim deliverables pertaining to these work plans.

Mr. Paul Rosasco, P.E.
May 9, 2013
Page 2

Thank you for giving us the opportunity to review and comment on these documents. If you have any questions pertaining to these comments, please contact me by phone at (573)751-3107; by written correspondence to my attention at the Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102; or e-mail to shawn.muenks@dnr.mo.gov.

Sincerely,

HAZARDOUS WASTE PROGRAM



Shawn Muenks, P.E.
Federal Facilities Section

SM:ls

Enclosure

c: Mr. Dan Gravatt, U.S. Environmental Protection Agency

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Comments on the West Lake Landfill Operable Unit 1 SFS Amendment Work Plans

GENERAL COMMENTS PERTAINING TO ALL WORK PLANS:

1.) ARARs and RAOs

The work plans do not describe how potentially Applicable or Relevant and Appropriate Requirements (ARARs) or Remedial Action Objectives (RAOs) will be identified. Will the ARARs and RAOs as specified in the SFS pertain to these new studies as well? If no new ARARs or RAOs are needed, how will this be confirmed? Please include a discussion in the work plans on how these components will be selected and/or updated from those in the SFS.

2.) NCP Evaluations

It is noted that these additional studies may result in new remedial alternative(s) or modifications to the ROD-selected remedy (i.e. the partial excavation alternative, alternative landfill cap designs, and treatment technologies). Please include a discussion in the appropriate work plan(s) on how the new or modified alternative(s) will be evaluated using the threshold and primary balancing criteria set forth in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR § 300.430 (EPA, 2009a). The relative performance of each new or modified alternative should be evaluated using the NCP criteria and compared to the original ROD-selected remedy and the SFS “complete rad removal” alternatives.

3.) Work Plan Titles

It is noted that some work plans are titled as such while others are titled “Scope of Work and Schedule”. If there is a specific reason for this, please elaborate in the appropriate work plans.

WORK PLAN SPECIFIC COMMENTS:

I. Work Plan – Alternative Area 2 Excavation Depths and Volumes (dated 11/12/2012)

4.) Page 1: The second, third and fourth paragraphs of the Introduction focus on verification of deep radiologically-impacted material (RIM) in borings WL-210 and WL-235 using the same data that the EPA National Remedy Review Board deemed unreliable. The Department feels that such an argument is irrelevant to the objective of this work plan and requests that these paragraphs be removed. As stated in previous comments, the Department believes minimal sampling could confirm/disprove presence of such deep RIM (see Department Comments on draft Supplemental Feasibility Study, General Comment #1, dated November 19, 2010).

5.) Page 3: In addition to those sections of the SFS identified for revision during this study, the Department has identified the following sections which discuss deep RIM in Area 2 for consideration during SFS revisions:

2.2.4 Estimated Volume of RIM

6.2.2.6 Implementability

6.2.2.6.1 Ability to Construct and Operate the Technology

6.2.3.6 Implementability

6.2.3.6.1 Ability to Construct and Operate the Technology

7.2.4 Implementability

Figure 27 - Evaluation of Remediation Technologies and Process Options

Table 10 - Comparative Analysis of Alternatives

Please review these sections for potential revisions to the SFS as they pertain to exclusion of the deep RIM from borings WL-210 and WL-235.

II. Work Plan – Partial Excavation Alternative (dated 12/4/2012)

- 6.) The Department has reviewed the referenced criteria from the Operable Unit 1 Feasibility Study (FS) used to define the FS Partial Excavation Alternative. It is not clear from the FS how the criteria of 1,000 pCi/g for radionuclide activity and 500,000 counts per minute (cpm) were derived to define a partial excavation alternative. Specifically, the FS states on page 83, second last paragraph, “The evaluations presented in Section 4.4.3 and Appendix B support the conclusion that there are no discrete, accessible principal threat wastes meeting the hot spot criteria as described in EPA’s presumptive remedy guidance.” The FS then goes on to calculate volumes of waste to be excavated using 100 pCi/g and 100,000 cpm, the values are then increased to 1000 pCi/g and 500,000 cpm to determine what appears to be an arbitrary volume of RIM for “hot spot” removal.

Section 2.2.8, page 22, of the SFS states, “Because the purpose of the SFS is to provide a thorough evaluation of the potential ‘complete rad removal’ alternatives relative to the ROD-selected remedy, it is conservatively assumed that principal threat wastes may be present within OU-1.” The Department is familiar with the process at other sites to use removal/containerization as the treatment option for principal threat wastes to reduce the toxicity and mobility. Therefore, the criteria used to define “principal threat waste” is also used to define the level of contaminants that will be removed under a partial excavation alternative. Will principal threat waste be used to determine the partial excavation alternative criteria presented in this work plan? Please include an explanation of the scientific approach used to define the criteria for the partial excavation alternative.

III. Scope of Work and Schedule – Evaluation of the Use of Apatite/Phosphate Treatment Technologies

- 7.) As mentioned in the previous comment to the partial excavation alternative, the SFS states that it is assumed that principal threat wastes may be present within OU-1. Will this treatment technology evaluation be used to determine potential treatment for principal threat waste? If so, please include this discussion in the work plan.
- 8.) Page 1: The second sentence under “Approach” states, “The RAOs developed for OU-1 did not include direct treatment of the waste materials or treatment of groundwater.” As stated in comment #1, please describe any new RAOs that may be needed in the SFS Amendment to address this evaluation.

- 9.) Page 2: The second item under “Results of Preliminary Evaluations” states, “Bench-scale testing at Oak Ridge has indicated that apatite may be effective in treating uranium and heavy metals in groundwater (this reportedly was to be followed up by a pilot-scale test but reports of the results of the pilot-scale testing, if performed, have not yet been located)”. Is a pilot-scale test at West Lake Landfill being considered to evaluate the apatite treatment technology? If so, please include a discussion on the feasibility of this pilot-scale test in the work plan.
- 10.) Page 2: The fourth item under “Results of Preliminary Evaluations” states, “DOE representatives indicated that owing to the potential disruption in chemical equilibrium within the waste matrix, such an application could result in an increase in leaching potential of radionuclides instead of a reduction in leaching potential that would be intended by such an application.” Please include a citation for this statement.
- 11.) Page 3: Numbered list that begins with “Furthermore, EPA previously determined that there is no unacceptable risk of groundwater contamination at the site. Specifically, the ROD contains the following conclusions:”. The Department is unclear on the intended purpose of this list. Is this list given to support the fact that groundwater treatment was not included in the SFS or is it an argument against the need to evaluate groundwater treatment technologies at this time? Please note that the ROD goes on to state on page 22, last sentence of the section from which these quotes were taken, “However, radionuclide and nonradionuclide contamination is present in the landfill units; the potential for leaching to groundwater and off-site migration is a pathway that should be addressed as part of the remedy for the Site.” Furthermore, current groundwater data is currently being collected and should be analyzed and included in the evaluation of potential groundwater treatment technologies. Please consider removing this list from the work plan or clarifying its purpose.
- 12.) Page 3: Third paragraph, first sentence states, “Consequently, groundwater was not determined to be a media of concern (i.e., no plume of groundwater contamination exists) and treatment of groundwater was not identified as a potential response action for the site in the prior FS or SFS.” The work plan should also mention that current groundwater data is being collected to verify the ROD determinations.
- 13.) Page 5: Opening sentence of numbered list states, “EMSI wastes to discuss with EPA the possible role of apatite or other groundwater treatment technologies relative to preparation of a Supplemental SFS report. These include the following:”. Should the word *wastes* be replaced with *wants*?
- 14.) Page 5: Numbered list, item #1. This item asks, “How the SFS should address the lack of/minimal nature of impacts to groundwater relative to any evaluation of potential apatite treatment technology for groundwater given that: a. Groundwater was not identified as a media of concern in the FS or SFS and therefore general response actions and remedial technologies for groundwater were not identified or evaluated in either document. [and] b. Groundwater treatment was not identified as being necessary (see above language from the ROD).” Please refer to comment #11 in which the Department questions the purpose of

quoting the ROD language. The Department reiterates its position that the determinations of groundwater impacts that led up to the ROD should not be the sole argument to abandon the evaluation of groundwater treatment technologies until the current groundwater sampling data has been analyzed.

IV. Work Plan – Additional Present Value Cost Estimates (dated 11/12/2012)

- 15.) Page 1: The first sentence of the second paragraph under “Approach” states, “A narrative will also be prepared to explain why both rates are being used for the SFS.” Please include such narrative in the work plan instead of the SFS Amendment. The work plan should contain information on why this is being done.

V. Scope of Work and Schedule – Alternative Cover Designs (dated 2/3/2013)

- 16.) Page 2: The first sentence of the third paragraph under the section titled “Evapotranspiration Cover” states, “Review of sites contained in EPA’s alternative cover database <http://clu.in.org/products/altcovers/> indicates that only two alternative cover designs have been documented in Missouri; one is a demonstration project installed in 1995 for an inactive fly ash waste pond at a power plant and the other is an ET cover constructed in 2003 over contaminated soil at a former wood treating plant.” What about sites in other states? The Department notes that there are over 200 sites nationwide (according to the cluin website) where ET cover is being designed or used, many of which are located in the Great Plains. Please consider including these sites in your review.
- 17.) Page 3: The first sentence under the section titled “Evapotranspiration Cover Design” states, “The initial screening of the potential implementability of an ET cover will evaluate the thickness of the soil cover that would be required to prevent percolation of precipitation from reaching the underlying waste materials.” The Department emphasizes the need for these landfill cover alternatives to meet Solid Waste Regulations ARARs. Please include discussion in the work plan how these ARARs will be evaluated (see comment #1).
- 18.) Page 3: The last sentence of the first paragraph under the section titled “Evapotranspiration Cover Design” states, “Modeling of the anticipated cover thickness would be performed using the UNSAT-H model (Fayer, 2000) or HYDRUS-1D (Šimůnek, et al., 2005).” The Department is not familiar with these modeling tools. Please provide references to where we can find more information about these modeling tools such as websites or studies where these tools have been used at other sites.
- 19.) Page 3: The first sentence of the second paragraph under the section titled “Evapotranspiration Cover Design” states, “If the technical implementability screening indicates that infiltration of precipitation can be minimized with an ET cover employing a fine-grained layer 5-feet thick or less, then this technology would be considered potentially implementable and would be subjected to further evaluation of its potential effectiveness, implementability and cost.” Why is the fine-grained layer restricted to 5-feet thick or less?
- 20.) Page 5: The first sentence of the last paragraph under the section titled “Deliverables”

states, "In the event that ET cover technology and/or GCL-alternate cover technology are found to be potentially applicable based on the site and waste conditions, there may be a need to develop one or more additional remedial alternatives for detailed analysis in the Supplemental SFS report." The Department is confused by this statement. Isn't the purpose of this work plan to develop additional *potential* remedial alternative(s) that utilize alternative cover designs for detailed analysis in the Supplemental SFS report?

VI. Scope of Work and Schedule – Fate and Transport Modeling (dated 4/19/2013)

- 21.) Page 1: The last paragraph under the Introduction states, "It is assumed that modeling calculations will be performed on the basis of existing site-specific data, augmented where necessary with information and values obtained from technical literature and/or derived from professional experience." Does this include groundwater data that was collected in July-August 2012 as well as groundwater data currently being collected? If groundwater data is being used in the modeling calculations, the recent data should be included in order to best represent site conditions.
- 22.) Page 2: The first sentence of the last paragraph under the section titled "Background" states, "As defined in the OU-1 ROD, the new landfill cover for Areas 1 and 2 would consist of the following, from bottom to top: 2-ft of rock consisting of well-graded pit run rock and/or concrete/asphaltic rubble ranging from sand-sized up to 8-inches; 2-ft of compacted clay or silt that when compacted at optimum moisture content possesses a coefficient of permeability of 1×10^{-5} cm/sec or less; and 1-ft of soil suitable of supporting vegetative growth." It is noted that the OU-1 ROD does not specify the bottom layer of the landfill cover to consist of "2-ft of rock consisting of well-graded pit run rock and/or concrete/asphaltic rubble ranging from sand-sized up to 8-inches". The OU-1 ROD refers to this layer as a "rubble or rock armoring layer". Please use the OU-1 ROD verbiage. The Department has previously commented on the need to further study the design of the armoring layer to meet the longevity requirements as specified in the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) guidance for a 1000-year design period. Also, does "a coefficient of permeability of 1×10^{-5} cm/sec or less" agree with the UMTRCA guidance?
- 23.) Page 3: The first sentence of the section titled "Fate and Transport Conceptual Site Model" states, "Because the overall mass of radium at the Site is small and future infiltration through the landfill materials will be less than at present due to the planned emplacement of an additional landfill cover over the existing landfill cover material, it might be expected that concentrations of radium will necessarily decline in the future." The Department does not understand the purpose of this statement. Please explain the relevancy of this statement as it pertains to ingrowth of radium over time. The fact that ingrowth of radium will result in increased concentrations of radium over time should be considered in development of the conceptual site model.
- 24.) Page 4: The third sentence of the first paragraph under the section titled "Primary Site-Specific Features" states, "This radiologically-impacted material (RIM) is currently covered by old landfill cover material." The previous overland gamma surveys conducted and

analytical data collected during the OU-1 Remedial Investigation identified areas where RIM is at the surface. Please revise this statement to include presence of surface RIM.

- 25.) Page 5: Table 1, Primary Events and Processes of Potential Radionuclide Fate and Transport at the Site. Please consider adding a Features, Events, and Processes (FEP) Element under "Events" which describes the inward gradient that may exist in relation to the active leachate collection at the Bridgeton Sanitary Landfill and the changes to the groundwater transportation model in the event the leachate collection would cease. The Department believes this is an important parameter to include in the fate and transport modeling as it plays an important role in potential for off-site migration.
- 26.) Page 8: The third sentence of the third paragraph under the section titled "Graded Approach" states, "If regulatory standards are not exceeded then no further analyses will be required." Please identify what regulatory standards are being used in this determination.
- 27.) Page 8: The third sentence under the section titled "Simulation Code Selection" states, "Since parameterization of the geochemical component of the model is likely subject to more variability and uncertainty than the groundwater flow component of the model - given the large number of chemical processes that potentially affect radium fate and transport - advective-dispersive migration will be simulated as one-dimensional (1-D), coupled with a rigorous treatment of the complex geochemical processes." Please explain how the "groundwater flow component of the model" will be represented. Will this be done with potentiometric surface maps? If so, please include recent data in this component of the model.
- 28.) Page 11: The first sentence under the section titled "Model Validation and Predictive Sensitivity Analysis" states, "Historical groundwater data have exhibited few detections of radionuclides." Please consider including groundwater data which was collected in July-August 2012 and data which is currently being collected to support this statement.